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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/556,930	11/14/2005	Takashi Abe	5453-053292	2150

28289 7590 10/04/2007
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EXAMINER

DAHIMENE, MAHMOUD

ART UNIT	PAPER NUMBER
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1765

MAIL DATE	DELIVERY MODE
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10/04/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/556,930

Applicant(s)

ABE ET AL.

Examiner

Mahmoud Dahimene

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/23/07, 4/14/06.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, are rejected under 35 U.S.C. 102(b) as being anticipated by Barber et al. (US 2002/0022292).

The reference of Barber discloses a method of shaping thin film piezoelectric resonators, summarized in figure 3, which includes all the limitations of applicant's claims 1 and 2. Barber cites "Material removal or an etching process can be used to transfer a shaped pattern in a resist to a shaped pattern in the piezoelectric material being removed." (paragraph 0009).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barber et al. (US 2002/0022292) as applied to claims 1, 2, and further in view of Schaper (US 6,849,558).

It is noted that Barber is silent about a precision stamp.

Schaper teaches a method for the duplication of microscopic patterns from a master to a substrate (abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Barber by shaping the resist with the method Schaper because Schaper teaches "This is a technique that can be applied as a complementary process or a replacement for various lithographic processing steps" (abstract). One of ordinary skill in the art would have been motivated to use the method of Schaper as a complementary process or a replacement for melting the photoresist in order to obtain finer and smaller features which is desirable for all kinds of microelectric or microelectronic devices.

Claim Rejections - 35 USC § 103

6. Claims 4, 5, are rejected under 35 U.S.C. 103(a) as being unpatentable over Barber et al. (US 2002/0022292).

Barber teaches "Utilizing an etching process (for example, reactive ion etching, wet chemistry or focus ion beam milling (FIB)), the resist 25 and material 21 are then etched at the required rates (as set forth in the etching process) such that the final structure 26 possesses the desired amount of doming, contouring or shaping for guiding the acoustic waves to the center of the resonator." , "If the removal rate of the material and resist is equal in any of the above material removal processes, the initial pattern which existed in the resist will be exactly reproduced in the material beneath the resist. If, however, the resist is removed at a rate which is half the rate of the removal of the underlying material for example, the initial pattern will be scaled as it is transferred to the underlying material.", finally "For example, change the type of reactive gas used during RIE, change the chemicals in which the wet etch is performed or change the type of chemicals used to perform the CMP. This provides greater flexibility during etching, and permits the creation of a broader range of final shapes."(paragraph 0029).

It is noted that Barber does not expressly disclose "the dry etching is started with a less selectively reactive gas for reforming the resist mask to a predetermined thickness profile and then continued with an etching gas having high selective reactivity to the piezoelectric material", however, Barber clearly teaches the concept of choosing selectivity of the etch step(s) to shape the material. Therefore, it would have been

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obvious to one of ordinary skill in the art at the time the invention was made to select the proper removal rate of the resist versus piezoelectric material including the case where the dry etching is started with a less selectively reactive gas for reforming the resist mask to a predetermined thickness profile and then continued with an etching gas having high selective reactivity to the piezoelectric material, because Barber teaches the broad concept of tailoring the etch steps to obtain a desired shape.


As to claim 5, for example, antireflective coating are very well understood to be deposited films on the surface of the substrate prior to depositing the resist mask.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Dahimene whose telephone number is (571) 272-2410. The examiner can normally be reached on week days from 8:00 AM. to 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



MD.

NADINE G. NORTON
SUPERVISORY PATENT EXAMINER

